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Central Chemical Corporation

Hagerstown, Maryland
CERCLIS #MDD003061447

■ Site Exposure Potential

The approximately 7.7-hectare Central Chemical Corporation is located within an area of mixed industrial, commercial, residential, and agricultural uses in Hagerstown, Maryland. The site is about 1.6 km from Marsh Run 2, which flows an additional 2.4 km to Antietam Creek. Antietam Creek discharges to the Potomac River approximately 24 km farther south (Figure 1; Woodward-Clyde 1997). From its confluence with Antietam Creek, the Potomac River flows about 140 km to Chesapeake Bay.

Central Chemical blended agricultural pesticides and fertilizers from the 1930s until the early 1960s. A fire destroyed pesticide operations in

1965. The facility resumed fertilizer manufacture from 1968 until 1984, when all operations ceased. Pesticides and fertilizers were handled in buildings on the northwestern and southwestern portions of the site (Figure 2). Pesticides blended at the site included DDT, aldrin, dieldrin, chlordane, endrin, methoxychlor, malathion, and lead arsenate. Fertilizer manufacturing used feedstocks of potash, superphosphate, ammonium sulfate, and nitrogen solutions (Woodward-Clyde 1997).

Aerial photographs from 1952 show two connected surface borrow areas. Former employees report discharges of lime sulfur slurry,

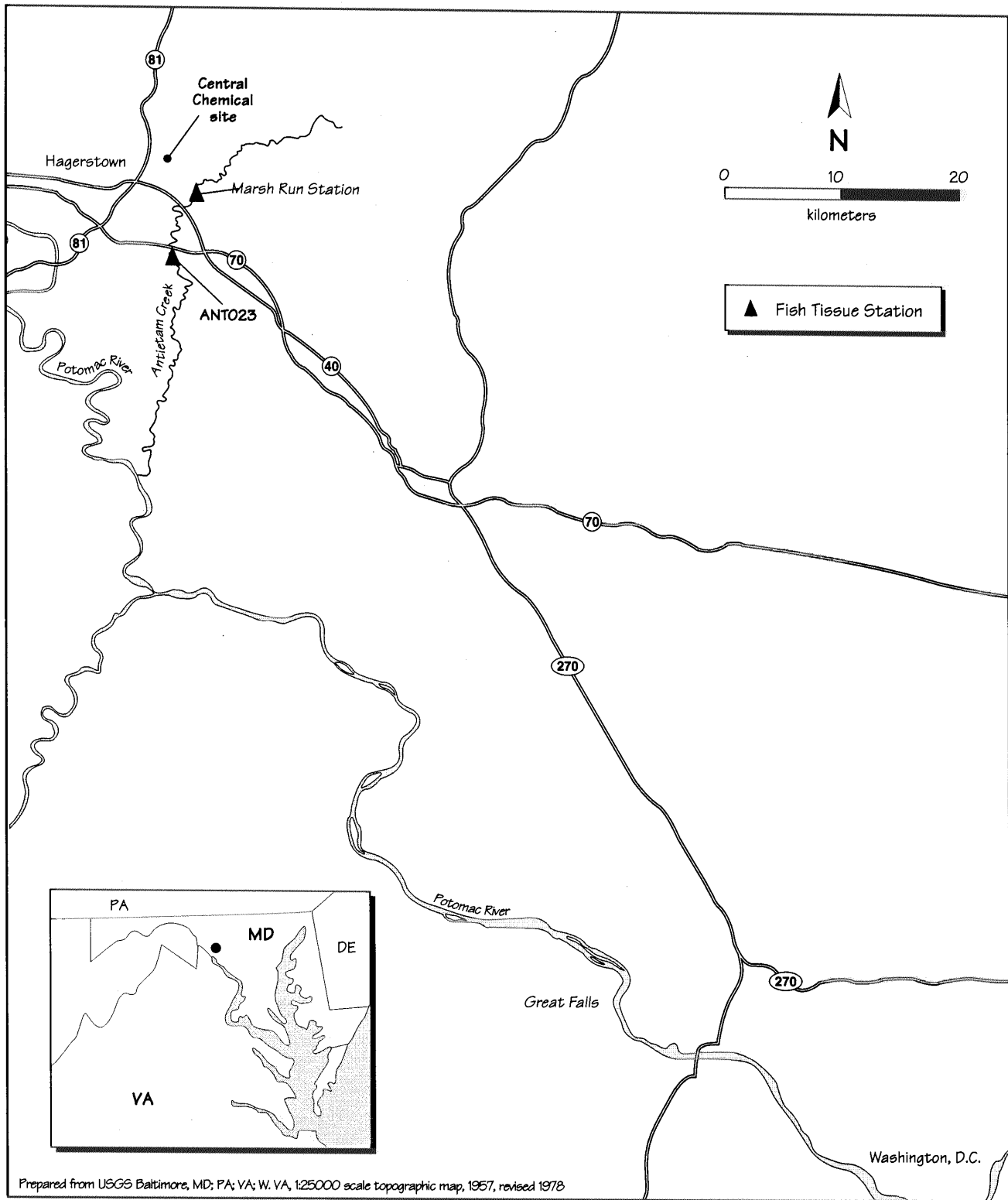


Figure 1. The Central Chemical Corporation study area.

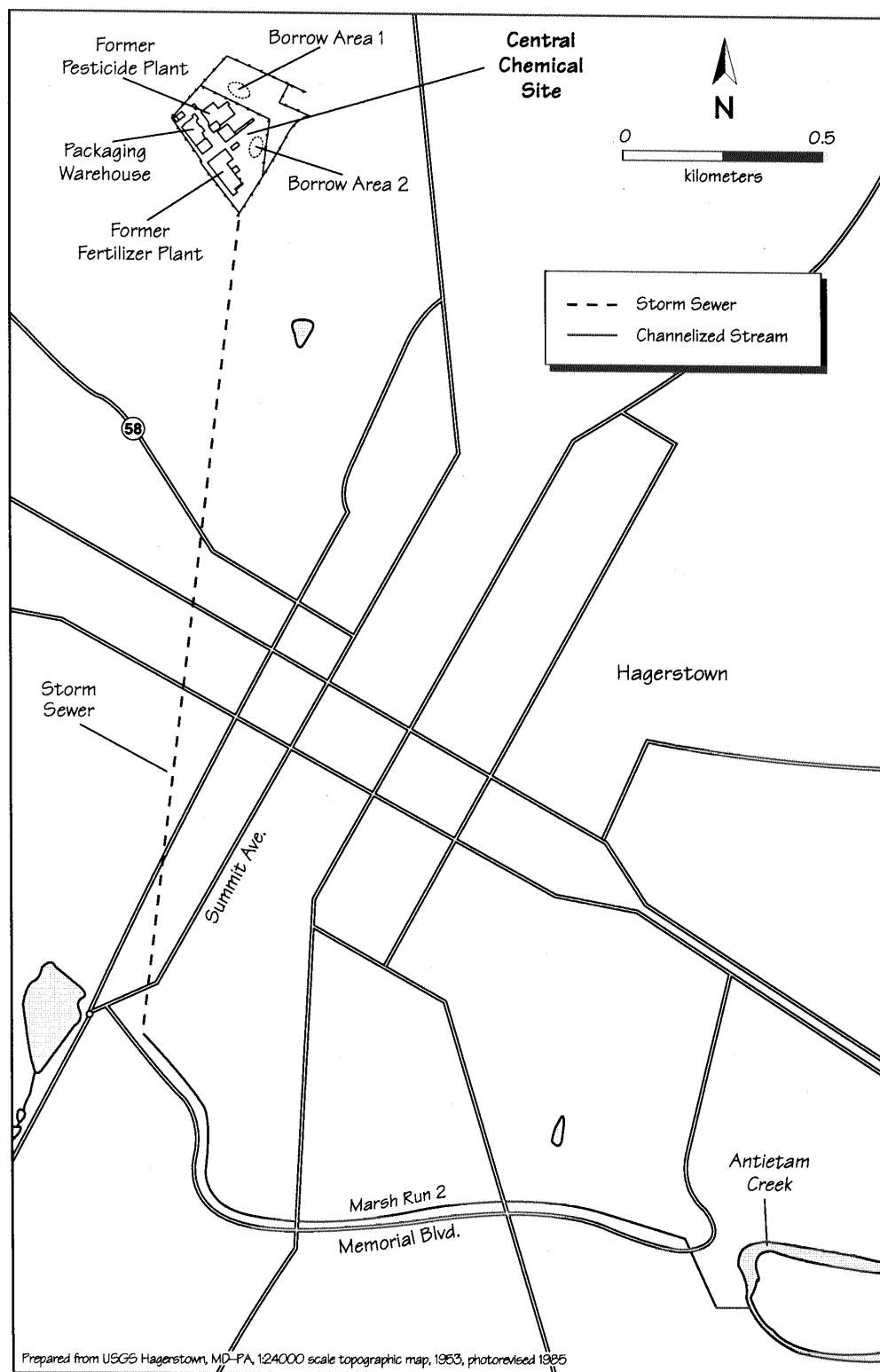


Figure 2. The Central Chemical Corporation site in Hagerstown, Maryland (Woodward-Clyde 1997).

pesticide residues, and waste acids to the larger borrow area. These surface borrow areas were capped with clay and soil and revegetated between 1976 and 1979 (Woodward-Clyde 1997). Now most of the site is vacant and overgrown.

The site was added to the National Priorities List in September 1997, based upon data from a Preliminary Assessment and Screening Site Investigation in 1989, and Site Assessments and Site Inspections conducted between 1992 and 1996. A workplan for a Remedial Investigation/Feasibility Study was submitted to EPA in December 1997.

Stormwater runoff, associated erosion, and groundwater transport of co-solvents are potential transport pathways for site-related contamination to offsite receptors. Some surface runoff from the property enters a storm drain that runs south for approximately 1.6 km, and is believed to discharge to Marsh Run 2. Groundwater, which has been encountered at 4.6 to 9.8 m below ground surface, flows to the southeast and may discharge into Antietam Creek.

■ NOAA Trust Resources

The NOAA trust habitat of concern is Antietam Creek, a moderate-sized tributary of the Potomac River with an average annual flow of about 200 cfs. The stream is low- to moderate-grade, about 15 m wide, and 1 to 2 m deep near the site. Typical riffle, run, and pool habitats

predominate along most of its length, although several dams on the stream form large pools. A warmwater fish assemblage, which typically includes smallmouth bass, sunfish, rockbass, cyprinid minnows, suckers, and redhorse are found in the stream. The State of Maryland manages the stream for recreational trout and smallmouth bass fisheries. The trout are stocked (natural reproduction is doubtful), but bass are indigenous (Mullican personal communication 1998).

Marsh Run 2 flows through Hagerstown and is a small, highly channeled stream that provides degraded habitat for aquatic organisms (Woodward-Clyde 1997).

The catadromous American eel has been documented throughout Antietam Creek, where it is the only trust species. Eel can traverse the lowhead dams on Antietam Creek, and populations are likely in Marsh Run 2, despite the degraded habitat. Approximately 70 km downstream of the Potomac River's confluence with Antietam Creek, Great Falls forms a natural barrier to anadromous fish migration into Antietam Creek (Mullican personal communication 1998).

■ Site Contamination

Site evaluations indicate that soils on the site and sediments in Marsh Run 2 both contain elevated concentrations of the hazardous substances used

by Central Chemical. The contaminants of concern are chlorinated pesticides and trace elements, which have been detected at high concentrations in source areas, and are widespread at lower concentrations in surrounding soils and sediment within Marsh Run 2 (Woodward-Clyde 1997).

Fish tissue collected in Antietam Creek shows elevated concentrations of site-related pesticides.

Table 1 summarizes maximum concentrations of contaminants at the site along with appropriate screening guidelines and local background concentrations for each medium. Table 2 summarizes contaminant concentrations measured in fish tissue.

Soil samples indicate that the two surface borrow areas are the most contaminated areas on the site, with DDT and DDD at maximum concentrations of 76,000 and 22,000 mg/kg, respectively. The maximum reported DDE concentration was 1,200 mg/kg (Woodward-Clyde 1997). Releases of DDT to the environment have been shown to slowly degrade to DDE and DDD (EPA 1980).

Three benzene hexachloride (BHC) isomers were each detected at concentrations above 100 mg/kg. Elevated trace element concentrations were measured in the surface borrow areas, where copper and lead both exceeded

Table 1. Maximum concentrations of contaminants of concern in soils and sediment detected on or near the Central Chemical site.

Contaminant	Soil (mg/kg) ^a		Sediment (mg/kg) ^a			TEL ^d
	Site	Background ^b	Marsh Run 2	Antietam Creek	Background ^c	
<u>Pesticides</u>						
alpha BHC	110	NR	0.00024	0.00042	ND	NA
beta BHC	790	NR	0.00054	0.00074	ND	NA
delta BHC	260	NR	ND	ND	ND	NA
DDD	22000	NR	0.034	0.074	0.00043	0.0035
DDE	1200	NR	0.014	0.028	0.0031	0.0014
DDT	76000	NR	0.091	0.14	0.0036	0.0070 ^t
<u>Trace Elements</u>						
Arsenic	310	10	3.8	4.7	4.4	5.9
Cadmium	1.1	ND	ND	ND	ND	0.60
Chromium	47	32	20	28	6.9	37
Copper	1200	23	30	29	ND	36
Lead	1300	29	41	150	59	35
Mercury	0.91	ND	0.71	ND	ND	0.17
Nickel	39	42	16	11	6.3	18
Zinc	650	82	69	160	61	120
<p>a: Woodward-Clyde (1997).</p> <p>b: Local background soil samples collected upgradient of the site.</p> <p>c: Local background sediment samples collected in Antietam Creek upstream of the confluence with Marsh Run 2.</p> <p>d: Threshold effect level; concentration below which adverse biological effects were rarely observed; (geometric mean of the 15% concentration in the effects dataset) as compiled by Smith et al. (1996).</p> <p>t: Criterion for sum of contaminant class, e.g., total concentration for all DDD, DDE and DDT isomers.</p> <p>NR: Not reported.</p> <p>ND: Not detected; detection limits not available.</p> <p>NA: Screening guidelines not available.</p>						

Table 2. Concentrations of DDT, DDE, and DDD in fish collected from Antietam Creek from 1979 to 1995.

Year	Station	Sample Species	Tissue	Concentration (mg/kg wet weight)			
				DDD	DDE	DDT	Total DDTs
1979	ANTO23	white sucker	whole	0.1	0.14	0.1	0.34
1980	ANTO23	white sucker	whole	0.25	0.13	0.12	0.5
1981	ANTO23	white sucker	whole	0.04U	0.07U	0.02U	0
1981	ANTO23	white sucker	fillet	0.04U	0.07U	0.02U	0
1982	ANTO23	white sucker	whole	0.06	0.24	0.02U	0.3
1983	ANTO23	white sucker	whole	0.26	0.1	0.02U	0.38
1984	ANTO23	white sucker	whole	0.15	0.13	0.045	0.32
1985	ANTO23	white sucker	whole	0.04U	0.12	0.02U	0.12
1985	ANTO23	rock bass	whole	0.75	0.14	0.205	1.1
1987	ANTO23	white sucker	whole	0.005	0.68	0.006	0.69
1989	ANTO23	white sucker	whole	0.004	0.025	0.006	0.035
1989	ANTO23	rock bass	fillet	0.0043U	0.15	0.0057U	0.15
1993	ANTO23	white sucker	whole	0.084	0.06	0.075	0.22
1993	ANTO23	white sucker	fillet	0.012	0.004	NA	0.016
1993	ANTO23	rock bass	fillet	0.024	0.14	0.59	0.76
1993	ANTO23	rainbow trout	fillet	0.011	0.014	NA	0.025
1995	Marsh Run	white sucker	fillet	0.037	0.092	0.1	0.23
1995	Marsh Run	rock bass	fillet	0.014	0.026	0.025	0.065
ANTO23 Maryland Department of the Environment monitoring station located 8.5 km downstream of the confluence of Antietam Creek and Marsh Run 2, as reported in Woodward-Clyde (1997). Marsh Run: Expanded Site Inspection station located at the confluence of Antietam Creek and Marsh Run 2, as reported in Woodward-Clyde (1997). U: Undetected at the detection limit shown. NA: Not analyzed.							

1,000 mg/kg and arsenic and zinc exceeded 300 mg/kg. Concentrations of pesticides are lower outside of the borrow areas, where, for example, the maximum DDT concentration was 1,400 mg/kg (Woodward-Clyde 1997).

Severe contamination has not been detected in groundwater at the site. While several pesticides were detected, only one reported concentration (dieldrin at 5.6 µg/L) exceeded its ambient water quality criterion (0.0019 µg/L).

Concentrations of DDT and DDE exceeded screening guidelines (TEL) in the sediment of Marsh Run 2 and Antietam Creek. Sediment samples collected in Antietam Creek upstream of

Marsh Run 2 had lower contaminant concentrations, suggesting that Marsh Run 2 is the source of the creek's sediment contamination (Woodward-Clyde 1997).

The Maryland Department of the Environment's fish-monitoring program has collected fish tissue from Antietam Creek since 1979 and analyzed samples for DDT, DDD, and DDE. These data indicate that low levels of total DDTs continue to accumulate in fish near the site. The fish-collection stations are at the confluence of Marsh Run 2 and Antietam Creek (Station Marsh Run) and about 8 km downstream of the confluence (Station ANTO23; Table 2). Fish samples col-

lected in Antietam Creek approximately 16 km upstream of Marsh Run 2 show non-detectable concentrations of total DDTs (Woodward-Clyde 1997).

■ Summary

The Central Chemical Corporation site is a former pesticide manufacturer and fertilizer blender located about 3 km from Antietam Creek within the Potomac River basin. Soils on the site are highly contaminated with chlorinated pesticides and trace elements. Sediments within Antietam Creek are contaminated with DDT and its degradation products at concentrations exceeding screening guidelines, potentially posing a threat to NOAA trust resources. DDT and its metabolites are found in resident fish species collected in the stream. The catadromous American eel, a NOAA trust resource, is found in Antietam Creek and may also inhabit Marsh Run 2.

■ References

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- U.S. Environmental Protection Agency. 1993. *Water quality criteria*. Washington, DC: Office of Water, Health and Ecological Criteria Division. 294 pp.
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